

## WE CLAIM:

1. A catalyst for treating an exhaust gas stream comprising:  
  
a  $\text{NO}_x$  occluding catalyst structure having an outer layer comprising an alkaline earth component and a rare earth component.
2. The catalyst of Claim 1 wherein the outer layer comprises an alkaline earth component in an amount of at least about 30 weight percent and a rare earth component in an amount of not more than about 70 weight percent.
3. The catalyst of Claim 2 wherein the outer layer comprises an alkaline earth component in an amount of at least about 50 weight percent and a rare earth component in an amount of not more than about 50 weight percent.
4. The catalyst of Claim 3 wherein the outer layer comprises an alkaline earth component in an amount of at least about 70 weight percent and a rare earth component in an amount of not more than about 30 weight percent.
5. The catalyst of Claim 1 wherein the alkaline earth component is selected from the group consisting of calcium, strontium, barium, and mixtures thereof.
6. The catalyst of Claim 5 wherein the alkaline earth component is calcium.

7. The catalyst of Claim 1 wherein the rare earth component is selected from the group consisting of lanthanum, cerium, neodymium, and mixtures thereof.

8. The catalyst of Claim 7 wherein the rare earth component is neodymium.

9. The catalyst of Claim 1 wherein the outer layer comprises a surface area stabilizer selected from the group consisting of oxides of silicon, titanium, zirconium, and mixtures thereof.

10. The catalyst of Claim 9 wherein the surface area stabilizer comprises zirconium.

11. The catalyst of Claim 9 wherein the outer layer comprises a surface area stabilizer in an amount not more than about 7 wt%.

12. The catalyst of Claim 11 wherein the outer layer comprises a surface area stabilizer in an amount not more than about 3 wt%.

13. The catalyst of Claim 1 wherein the outer layer comprises a binder selected from the group consisting of acidic aluminum oxide sol, alkaline aluminum oxide sol, ammonium aluminum oxide sol, and mixtures thereof.

14. The catalyst of Claim 13 wherein the outer layer comprises an ammonium aluminum oxide sol binder.

15. The catalyst of Claim 13 wherein the outer layer comprises a binder in an amount at least about 2 wt% and less than about 6 wt%.

16. A catalyst for treating an exhaust gas stream comprising:

a NO<sub>x</sub> occluding catalyst structure comprising an alkaline earth exchanged zeolite and an alkaline earth alumina having an outer layer comprising an alkaline earth oxide component, a rare earth oxide component, a surface area stabilizer,  
5 and a ceramic oxide binder

17. The catalyst of Claim 16 for treating an exhaust gas stream comprising:

a NO<sub>x</sub> occluding catalyst structure having an outer layer comprising at least about 30 wt% alkaline earth oxide component, not more than about 59 wt % rare  
5 earth oxide component, not more than about 7 wt% surface area stabilizer, and not more than about 4 wt% ceramic oxide binder.

18. The catalyst of Claim 16 for treating an exhaust gas stream comprising:

a NO<sub>x</sub> occluding catalyst structure having an outer layer comprising at least about 50 wt% alkaline earth oxide component, not more than about 42 wt % rare earth oxide component, not more than about 5 wt% surface area stabilizer, and not more than about 3 wt% ceramic oxide binder.

19. The catalyst of Claim 16 for treating an exhaust gas stream comprising:

a NO<sub>x</sub> occluding catalyst structure having an outer layer comprising about 70 wt% alkaline earth oxide component, about 25 wt % rare earth oxide component, about 3 wt% surface area stabilizer, and about 2 wt% ceramic oxide binder.

20. A catalyst for treating an exhaust gas stream comprising:

a NO<sub>x</sub> occluding catalyst structure having an outer layer comprising at least about 70 wt% calcium oxide component, not more than about 25 wt % neodymium oxide component, not more than about 3 wt% zirconium surface area stabilizer, and at least about 2 wt% ammonium aluminum oxide sol binder.